

BmNR 3424
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Portland, Oregon
April 10, 1959

Pacific Northwest Forest and Range Experiment Station

Establishment Record

A STUDY TO EVALUATE SUSCEPTIBILITY OF
VARIOUS SPRUCES TO THE SITKA SPRUCE WEEVIL

Introduction

The Sitka spruce weevil (Pissodes sitchensis Hopk.) has long been a serious enemy of young Sitka spruce throughout the range of the host along the coasts of Oregon and Washington. Because the mature spruce forest has been largely cut, a high percentage of the type now consists of young trees of weevil susceptible age. Forest land managers have reported increasing damage by the insect, which kills the leaders of the trees, and have urgently requested means of control.

In an attempt to solve the problem a small-scale study was started in 1958 by The Industrial Forestry Association, Weyerhaeuser Timber Company, and the Pacific Northwest Forest and Range Experiment Station. Others cooperating in the undertaking were the Washington State Department of Natural Resources and the Werner-Mayr Logging Company. In order for the study to proceed as planned and to inform the participants of what has been accomplished to date, this informal work plan-plot installation record has been prepared.

Objectives of the Study

1. To test the susceptibility of various species and hybrids of spruce to the Sitka spruce weevil.
2. To determine the survival, growth rate, and wood quality of these species and hybrids when grown in the Pacific Northwest.

Design of the Experiment and Data to be Taken

Three plots, each to contain 10 trees of each of 10 species or hybrids (100 trees total per plot) were established. The trees within each plot were completely randomized as to location, and planted at 8 x 8 spacing. All tree locations have cedar stakes with aluminum tags showing tree species and number.

In addition to the 10 trees of each species to be planted in the randomized plots, a number will be planted adjacent to the plot for "fill-in" in case of mortality.

The plots will be visited annually, in September or October, and the following data taken on each tree: current leader growth, total height, weevil damage, and other damage. Diameter growth will be recorded after the trees have reached about 2 inches d.b.h.

Location of Study Areas

The three study plots are located in the vicinity of Raymond, Washington. General locations are as follows:

Werner-Mayr Plot - on land owned by Werner-Mayr Logging Co., approximately 20 miles northeast of Raymond on the North River Road near Vesta.

Weyerhaeuser Plot- On Weyerhaeuser land, about 6 miles north of Raymond on the Smith Creek Road.

State Plot - on State land, approximately one and one-half miles south of Raymond.

Detailed directions for reaching the plots is shown on the plot record sheets.

Species to be Planted and Source of Stock

Of the ten species to be tested, seven have been obtained in seed or seedling form so far; they are:

<u>Picea abies</u>	- Norway spruce
<u>P. glauca</u>	- White spruce
<u>Wild P. sitchensis</u>	- Sitka spruce
<u>Nursery P. sitchensis</u>	- Sitka spruce
<u>X P. lutzii</u>	- Natural glauca-sitchensis hybrid
<u>P. engelmanni x glauca</u>	- Engelmann-white spruce hybrid
<u>P. sitchensis x glauca x glauca</u>	- Sitka-white spruce backcross

Of the above seven species, only three reached sufficient size to be outplanted in 1958. They were P. abies, X P. lutzii, and P. glauca. The balance of the ten species to be tested is now being selected; those now in the nursery will be outplanted as soon as they have reached sufficient size -- usually 2-0. Dr. J. W. Duffield is growing the stock in the Colonel William B. Greeley Nursery at Nisqually, Washington.

Work Accomplished in 1958

Following is a list of the jobs that were completed in 1958.

1. The experimental design was agreed on, and the randomization of tree location within each of the three blocks made in mid-March.
2. Stakes and tags for each tree location were made at the Weyerhaeuser Forestry Research Center in late March.
3. On April 15, the plots were selected, laid out, and the available trees planted. Those participating in this work were: Walt Swenson and Bill Groman of the State Dept. of Natural Resources; Jack Duffield and Bob Campbell of the Industrial Forestry Association; Jack Winjum and George McAninch of Weyerhaeuser; and Ken Wright of the PNW Forest and Range Experiment Station.
4. On October 23, the following individuals checked the plots for establishment and height growth: Jack Duffield, Boyd Wilson, Jack Winjum, Walt Swenson, Paul Buffam (Exp. Sta.) and Ken Wright.
5. In November, Paul Buffam prepared formal copies of the plot layout, species planting code, and directions for reaching plots. He also summarized the growth and mortality that occurred in 1958. Copies of these records were prepared for each cooperator and are attached.

Summary of 1958 Plot Examination

The Weyerhaeuser and State plots are doing very well, with all trees surviving. No disturbance has occurred, and no maintenance is needed at present. The Werner-Mayr plot suffered mortality of 8 trees, apparently due to the high water table. Actual flooding has probably occurred at times since plot installation. Severe competition from grass, and resultant sod, is also occurring on this plot.

Of the 8 dead trees, 4 were the natural P. sitchensis - P. glauca hybrid, X P. lutzii; 3 were P. abies, Norway spruce; and one was a P. glauca, white spruce. All the living reserve X P. lutzii were used to replace those that died within the plot, and 2 more were needed. In the reserve bed, there were still 2 living P. abies and 3 P. glauca.

From the standpoint of leader growth the first year, P. abies was best (average 5.3 inches), followed by X P. lutzii (3.8 inches), and P. glauca (1.6 inches).

Two trees were slightly browsed on the state plot, but none on the other two plots.

Prepared by,
K. H. Wright
P. E. Buffam

Spruce Weevil Plot Examination

Summary of Height Growth in 1958

Species	Measurement	Growth by Plots			
		State	Weyer- haeuser	Werner- Mayr	Average All Plots
		<u>Inches</u>	<u>Inches</u>	<u>Inches</u>	<u>Inches</u>
<u>X Picea lutzii</u>					
	Average ht. at planting	8.4	10.0	11.1	9.6
	Average ht. after 1958 season	11.4	14.4	15.2	13.4
	Average ht. growth in 1958	3.0	4.4	4.1	3.8
<u>Picea abies</u>					
	Average ht. at establishment	9.7	10.7	11.4	10.5
	Average ht. after 1958 season	15.3	16.3	15.9	15.8
	Average ht. growth in 1958	5.6	5.6	4.5	5.3
<u>Picea glauca</u>					
	Average ht. at establishment	5.5	5.6	5.1	5.4
	Average ht. after 1958 season	6.3	7.6	7.2	7.0
	Average ht. growth in 1958	0.8	2.0	2.1	1.6

Chief, U. S. Forest Service
Attention: Dr. J. A. Beal

April 10, 1959

R. W. Cowlin, Director

RX-NW INSECTS OTHER THAN BARK BEETLES, General (Sitka Spruce Weevil)

Attached is a statement by K. H. Wright and P. E. Buffam which describes a small cooperative study that is in progress on the Sitka spruce weevil. As you know, requests for work on this insect have been increasing for several years, and we have been putting as much effort on it as could be spared from other projects.

This study on susceptibility of various species and hybrids to the weevil is a cooperative one, and requires very little effort on the part of Forest Insect Research personnel. However, it appears to us to offer good possibilities of determining whether weevil resistant spruce species may be developed. It also offers Wright an opportunity to investigate tree resistance to forest insects, a field in which he is representing the Station in the Western Forest Genetics Association.

Enclosures

R. W. Cowlin

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